Pascoe, King, Macalister, Mitchell. Exhibitioners: Crocker, Denham, Simpson, Balls. Hockin Prizeman (for electricity): Browning. Engineering Scholar: Paton.

THE attention of teachers and others engaged in schools is directed to the appeal made by Prof. Karl Pearson in our correspondence columns. Observations of the physical and mental characters of children are required, and measurements of the head, in order to provide material for an investigation of heredity upon which Prof. Pearson is engaged. There should be no difficulty in obtaining the co-operation of masters and mistresses in schools in this work, for the observations and measurements can be made with very little trouble, and they are of as much interest from an educational point of view as they are to biological science.

SCIENTIFIC SERIAL.

Bulletin of the American Mathematical Society, May.—The number opens with four papers read before the Society at the dates annexed: On the geometry of the circle, by Dr. V. Snyder (December 28, 1899); isomorphism between certain systems of single linear groups, by Prof. L. E. Dickson (February 24); the Hessian of the cubic surface ii., by Dr. J. I. Hutchinson (February 24); and note on the group of isomorphisms, by Dr. G. A. Miller (February 24). These papers are short and, in the main, continuations of work previously published by the authors.—Prof. F. S. Woods contributes an interesting sketch of a German translation, by F. Engel, of two articles by Lobachevsky, with the titles "Ueber die Anfangsgründe der Geometrie" and "Neue Anfangsgründe der Geometrie mit einer Vollständigen theorie der Parallellinien." The reviewer's conclusion is that, "while it is remarkable that the solution of a two-thousand-year-old problem should be given almost simultaneously by three men, it should be remembered that these three were not the only mathematicians who had worked upon the problem. More than one had missed the solution by a hair's breadth only; Lobachevsky, Bolyai and Gauss succeeded in finding it."—Other notices are Vogt's "Algebraic solutions of equations," by J. Pierpont; the elements of the differential and integral calculus, based on the work by Nernst and Schönflies (translated by W. A. Young and C. E. Linebarger), by L. E. Dickson; and E. Pascal's "Die Variationsrechnung," by J. K. Whittemore.—University and general mathematical information come into the "Notes" and "New Publications."

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, April 5.—"The Kinetic Theory of Planetary Atmospheres." By Prof. G. H. Bryan, F.R.S.

The application of the kinetic theory to the atmospheres of planets dates from the paper of Waterston, who gave an investigation based on the then only possible assumption of equal velocities for all molecules, an assumption since known as Clausius' law. Of later papers reference is due in especial to Dr. Johnstone Stoney's memoir "Of Atmospheres on Planets and Satellites" (*Trans.* R. Dublin Soc.), in which the test of permanence of a gas in the atmosphere of a planet is made to depend on the ratio of its velocity of mean square to that relative velocity which would enable a suitably projected body to escape from the planet's attraction. If it be admitted, as Dr. Stoney assumes, that helium cannot exist in our atmosphere, it follows that vapour of water cannot exist on Mars.

The author's object has been to investigate the logical conclusions obtained by applying the Boltzmann-Maxwell distribution to the atmospheres of planets. In 1893 calculations were made, having special reference to the absence of atmosphere from the moon, but these took no account of axial rotation. When this cause is taken into account, the distribution of co-ordinates and *relative* velocities of the molecules is found to be the same as if the planet were at rest, and "centrifugal force" applied to the system. The surfaces of equal density are of the forms originally investigated by Edward Roche, of Montpellier, and they cease to be closed surfaces when passing to the outside of the point on the equatorial plane where centrifugal force just balances the planet's attraction. Calling the surface through this point the "critical surface," the density of molecular distribution over this surface must be very small to ensure permanence. The ratio of the density at the planet's surface to the density at the critical surface has been called the "critical density ratio," and the author calculates its logarithm for particular gases at different temperatures on the various planets. The use of this logarithm has the advantage that the calculation can at once be extended to any gas at any temperature.

The high value obtained in the case of helium, considered in reference to the earth, appears to afford abundant proof that if helium existed in our atmosphere it would possess a very high degree of permanence at ordinary temperatures. To test this point further, a calculation is made of the total rate at which molecules would flow across the critical surface, this rate being regarded as a superior limit to the rate at which the planet would lose its atmosphere, since it takes no account of molecules which describe free paths beyond the limit and fall back again. To further exhibit the results in a tangible form, the rate of flow is estimated by the number of years in which the total amount of gas escaping across the critical surface would be equal to the amount of the gas in a layer covering the surface of the planet to the depth of 1 cm. This measure is independent of the actual quantity of the gas under consideration existing in the atmosphere, since, if this quantity be increased, the rate of flow across the critical surface and the amount of gas present in the surface layer 1 cm. thick will be increased in the same proportion.

If a gas of molecular weight 2, such as helium, be supposed to exist in the earth's atmosphere, the loss in question would occupy $3{\cdot}5 \times 10^{36}$ years at $-73°$ C., 3×10^{19} years at 27°, $8{\cdot}4 \times 10^{10}$ years at 127° C., 6×10^{5} years at 227° C., and 222 years at 327° C.

If we halve the absolute temperatures, we have the conditions applicable to hydrogen, the losses in question therefore taking place in $8{\cdot}4 \times 10^{10}$ years at $-73°$ C., 6×10^{5} years at $-23°$ C., and 222 years at 27° C.

For water vapour on Mars, the corresponding results are $1{\cdot}2 \times 10^{33}$ years at $-73°$, $1{\cdot}9 \times 10^{16}$ years at 27°, $2{\cdot}4 \times 10^{9}$ years at 127°, $4{\cdot}3 \times 10^{5}$ years at 227°, and 106 years at 327°.

These figures indicate that helium cannot practically escape from our atmosphere at existing temperatures, nor can vapour of water escape from the atmosphere of Mars. A leakage may, and undoubtedly does, take place, which may appear considerable when estimated by the number of actual molecules escaping, but it is wholly inappreciable relative to the mass of gas left behind.

At a future time it is proposed to examine the corresponding results, based on the hypothesis that the atmosphere of a planet is distributed according to the adiabatic instead of the isothermal law.

"On the Weight of Hydrogen desiccated by Liquid Air." By Lord Rayleigh, F.R.S.

In recent experiments by myself and by others upon the density of hydrogen, the gas has always been dried by means of phosphoric anhydride; and a doubt may remain whether, on one hand, the removal of aqueous vapour is sufficiently complete, and on the other, whether some new impurity may not be introduced. I thought that it would be interesting to weigh hydrogen dried in an entirely different manner, and this I have recently been able to effect with the aid of liquid air, acting as a cooling agent, supplied by the kindness of Prof. Dewar from the Royal Institution. The operations of filling and weighing were carried out in the country as hitherto. I ought, perhaps, to explain that the object was not so much to make a new determination of the highest possible accuracy, as to test whether any serious error could be involved in the use of phosphoric anhydride, such as might explain the departure of the ratio of densities of oxygen and hydrogen from that of 16 : 1. I may say at once that the result was negative.

Each supply consisted of about six litres of the liquid, contained in two large vacuum-jacketed vessels of Prof. Dewar's design, and it sufficed for two fillings with hydrogen at an interval of two days. The intermediate day was devoted to a weighing of the globe *empty*. There were four fillings in all, but one proved to be abortive owing to a discrepancy in the weights when the globe was empty, before and after the filling. The gas was exposed to the action of the liquid air during its passage in a slow stream of about half a litre per hour through a tube of thin glass.

I have said that the result was negative. In point of fact the actual weights found were $\frac{1}{10}$ to $\frac{2}{10}$ milligrams *heavier* than in the case of hydrogen dried by phosphoric anhydride. But I

doubt whether the small excess is of any significance. It seems improbable that it could have been due to residual vapour, and it is perhaps not outside the error of experiment, considering that the apparatus was not in the best condition.

May 31.—"Palæolithic Man in Africa." By Sir John Evans, K.C.B., F.R.S.

In April 1896, just four years ago, I ventured to call the attention of the Society (*Roy. Soc. Proc.*, vol. lx. p. 19) to some palæolithic implements found in Somaliland by Mr. H. W. Seton-Karr. In doing so, I pointed out the absolute identity in form of these implements with those from the valley of the Somme and numerous other pleistocene deposits in North-western Europe and elsewhere; and I cited others from the high land adjoining the valley of the Nile, and from other places in Northern and Southern Africa. I was at the same time careful to point out that though there could be no doubt as to this identity in form, no fossil mammalian or other remains had been found with these African implements. I did not, however, hesitate in claiming them as palæolithic.

Since the publication of my short note, an extensive collection of stone implements formed in Egypt by Mr. H. W. Seton-Karr has been acquired by the Mayer Museum at Liverpool. I have not had an opportunity of examining the specimens, but a detailed account[1] of them, with numerous illustrations, has been published by the Director of the Liverpool Museums, Dr. H. O. Forbes. The majority of the implements are of Neolithic Age or even of more recent date, and with the account of these I need not here concern myself; but the author is at considerable pains to dispute my view that the instruments of palæolithic forms belong to the Palæolithic Period. As he says, Mr. Seton-Karr's statement that he sometimes found spear-heads "on the ground surrounded by a mass of flakes and chips as though the people had dropped their work and fled," is very suggestive and important. He adds, however, that "one such occurrence is almost sufficient in itself, I venture to think, to disprove the high antiquity claimed by Sir John Evans for these implements."

Were it certain that the so-called spear-heads were really of palæolithic form, and had the flakes and chips been fitted on to them so as to reconstitute the original blocks of flint, as has been done in the case of undoubted palæolithic specimens by Mr. Spurrell and Mr. Worthington Smith, the question would still remain to be discussed as to the condition of the localities in relation to subaërial denudation.

It is, however, hardly necessary to discuss these points, as some recent discoveries made in Algeria will, I venture to think, go a long way towards settling the question. I propose, therefore, very briefly to state their nature. About sixty miles to the south-west of the town of Oran, and about ten miles to the north of Tlemcen, on the plateau of Remchi, about a mile to the south of the River Isser, lies a small lake known as Lac Karâr. It occupies a depression in lacustrine limestone of comparatively recent geological date, superimposed on beds of Lower Miocene Age. The level of the water, which is some 15° C. warmer than that of the ordinary springs of the district, and appears to be derived from some deep-seated source, seems to be about 600 feet higher than that of the River Isser. The lake originally filled a much larger part of the depression than it does now, and from its old bed a considerable amount of material has of late years been extracted for the Service des Ponts et Chaussées. This material consists of sand and gravel rich in iron pyrites, in the midst of which lie, pell-mell, bones of animals and stone implements fashioned by the hand of man.

These have for some years been diligently collected by M. Louis Gentil, a geologist, and form the subject of a memoir that has just appeared in *l'Anthropologie* (Tome xi.), by my friend M. Marcellin Boule, of the Galerie de Paléontologie at the Jardin des Plantes, Paris. Some 200 specimens of implements have been submitted to him, of various sizes, and all or nearly all of well-known palæolithic forms, including several with a broad chisel-like end, of which examples have been found in the laterite of Madras and the gravels of Madrid. They are for the most part formed of an eocene quartzite, though some smaller specimens of the type known as that of "le Moustier" are formed of flint. The *facies* of these latter is not so distinctly palæolithic as that of the former, of which some, through the kindness of M. Marcellin Boule, are exhibited.

The most important part of the discovery is that which relates to the mammalian remains found with the implements. These are of elephant, rhinoceros, horse, hippopotamus, pig, ox, sheep, and certain cervidæ. I will not detain the Society with the details given in M. Boule's memoir, but I may call attention to the fact that the elephant is not the African elephant, but one more nearly related to the quaternary or even pliocene elephants of Europe, to which the designation Atlanticus has been given. Some teeth seem closely allied to those of *E. meridionalis* and even *E. armeniacus*. Having regard to the whole fauna, M. Boule arrives at the conclusion that it is identical with that of the fossiliferous deposits of Algeria, which from their topographical or stratigraphical characteristics have been assigned to the Quaternary or Pleistocene Period. He also cites other instances in Algeria, such as Ternifine and a station near Aboukir, in which palæolithic implements have been found associated with the remains of a similar pleistocene fauna.

Altogether, these recent discoveries in Northern Africa tend immensely to strengthen my position with regard to the truly palæolithic character of the implements found in other parts of that vast continent, and I am tempted to bring for comparison some few specimens from South Africa. One of these, found by Mr. J. C. Rickard at the junction of the Reit and Modder twenty years ago, is almost indistinguishable from those of the Lac Karâr, as is also one from the valley of the Embabaan in Swaziland. But the most remarkable is an implement of typically palæolithic character found in 1873 under 9 feet of stratified beds at Processfontein, Victoria West, by Mr. E. J. Dunn.[1] May the day be not long distant when researches for the implements of palæolithic man may again be carried on, and trenches be dug in South Africa for peaceful instead of warlike purposes.

Anthropological Institute, June 5.—Mr. C. H. Read, President, in the chair.—Dr. J. G. Garson explained in detail the metric system of identification of criminals which is in use in this country. This system, which is a modification of the Bertillon system employed in France, consists in measuring as accurately as possible certain dimensions of the individual, and classifying them, according as they prove severally large, medium or small, in such a way that the search for any single set of measurements at the central office is curtailed to the utmost. Finger prints are used, as an additional proof of identity, on the back of the card which carries the record of the measurements. The paper was illustrated by diagrams and examples of the measurements and of the instruments which are employed; and was followed by a discussion.

June 12.—Mr. C. H. Read, President, in the chair.—The secretary exhibited, on behalf of Mr. H. Swainson Cowper, a primitive figurine from Adalia in Asia Minor, which presented analogies with the "owl-faced idols" found on the site of Troy by Dr. Schliemann.—Mr. B. H. Pain read a paper on Eskimo craniology, in which he stated that from observations on a number of living Eskimo, lately in London, he had been enabled to extend the comparisons instituted by Virchow between the dimensions of the head and those of the skull in this race. Reference was incidentally made in the paper to the collection of Eskimo crania at Cambridge (of which a descriptive note was published in the *Journal* of the Anthropological Institute, 1895), as well as to the large collection of crania of Greenlanders in the Anatomical Museum at Copenhagen. The paper was fully discussed by M. J. Deniker, Dr. Garson, Mr. Duckworth and Mr. Shrubsall.—Mr. W. L. H. Duckworth read a paper on the skeletal characters of the Mori-ori of the Chatham Islands. The result of his observation and measurement of ten skulls and two complete skeletons of Mori-ori (from the Chatham Islands) is a general corroboration of the earlier results of Turner (*Challenger* Report) and Scott (*Transactions* of the New Zealand Institute) as to the characters of the skeletons of these Pacific Islanders. Special notice was directed to the frequency of occurrence of osteo-arthritis, as evidenced by the condition of the sacrum, innominate bones and femora especially, and to the rare form of occipito-atlantic articulation in one of the specimens. The paper was followed by a discussion.—Mr. J. Gray gave a summary of the anthropometric survey conducted by Mr. James Tocher and himself in East Aberdeenshire, and exhibited diagrams showing the relative frequency and the local

[1] *Bull. Liverp. Mus.*, II., Nos. 3 and 4 (Jan. 20); NATURE, vol. lxi. April 19, p. 597.

[1] See also a paper by M. E. T. Hamy in the *Bulletin du Muséum d'Histoire Naturelle*, 1899, No. 6, p. 270.

distribution of various types of complexion, &c.—A paper, by Mr. D. MacIver, on recent anthropometrical work in Egypt, was taken as read.

EDINBURGH.

Royal Society, June 4.—Prof. M'Kendrick, Vice-President, in the chair.—Dr. R. Stewart McDougall read a paper on the biology of certain species of *Pissodes* and *Scolytus*. *Pissodes* is a genus of Coleopterous insects very harmful to pine trees in Great Britain, the eggs being laid under the bark, and the grubs tunnelling in the Cambial layer. In working out the life-history of *P. notatus*, a pest on young pines, and of *P. pini*, which attacks chiefly grown trees, the author found that imagos could be obtained from March to November, and that breeding might take place from April to September inclusive. A remarkable feature was the long life of adult beetles of both sexes, with repeated copulation. Specimens of *P. notatus* had lived 22, 24 and 37 months, hibernating twice in the first two cases and three times in the last case. Marked adults kept in confinement, but otherwise in natural conditions, began hibernation in November, and appeared above ground again in the following March. *Scolytus multistriatus* attacks the elm—almost invariably dead or decaying trunks or branches. Attempts to develop the eggs in living trees had failed. The beetles are late swarmers, appearing chiefly in July. The generation is an annual one.—Sir John Murray read a paper on the physical, chemical, and biological conditions of the Black Sea. Certain peculiar features were pointed out, notably the presence of a cold layer at a depth of 50 fathoms, the deeper waters being warmer; the lack of vertical circulation, and the consequent stagnation of the deep waters, which can find no outlet through the comparatively shallow straits; the presence of sulphuretted hydrogen and the absence of oxygen in these depths; the absence of animal life there; and the deposit of carbonate of lime on the bottom. This carbonate of lime was not of organic origin, but was formed by chemical action, the sulphuretted hydrogen being one of the products. The special interest of the inquiry arose from the fact that in several of these particulars the Black Sea conditions differed fundamentally from conditions that obtained in oceans and other ocean-connected seas.

Mathematical Society, June 8.—Mr. R. F. Muirhead, President, in the chair.—The following papers were read:—(1) A general proof of the addition theorems in trigonometry; (2) a slight extension of Euler's theorem on homogeneous functions, by W. Edward Philip; note on proofs by projection in trigonometry and co-ordinate geometry, by Prof. Gibson.

PARIS.

Academy of Sciences, June 11.—M. Maurice Lévy in the chair.—Reduction of certain problems of heating or cooling by radiation to the more simple case of heating or cooling of the same bodies by contact; heating of a wall of indefinite thickness, by M. J. Boussinesq.—On the radiation of uranium, by M. Henri Becquerel. The rays from uranium are deviable in a magnetic field, although on account of the comparatively feeble action of the uranium radiations, the time of exposure of the photographic plates has to be very long. Uranium salts treated with barium salts and a sulphate have their radio-activity reduced. The author has not been able to obtain an inactive uranium salt.—Researches on the pressures of saturated mercury vapour, by MM. L. Cailletet, Colardeau and Rivière. An experimental study of the vapour pressure of mercury from its boiling point up to about 880°. At the point where the pressure is about 160 atmospheres, the experiments were stopped by the iron tubes allowing the mercury to pass through them, thus rendering the study of the critical phenomena of mercury impossible. The pressures were read on a metallic manometer which had been directly calibrated against a mercury column, and the temperatures on a thermo-couple.—On the β-phenyl and β-benzyl-α-alkoxy-α-cyanoacrylic acids, by MM. A. Haller and G. Blanc. Starting with phenylacetylcyanacetic and benzylacetylcyanacetic esters, the silver salts are prepared and these treated with alkyl iodide. The esters so obtained are isomeric with the benzoylcyanacetic esters, and are clearly derivatives of crotonic acid.—Note on an earthquake in Mexico on December 19, 1899, by the French Consul in Mexico.—On a photograph obtained at the Observatory of Algiers during the total eclipse of the sun of May 28, by M. Ch. Trépied.—On the polarisation of the corona of the sun observed at Elche, by M. P. Joubin. The experiments of Prazmowski and Ranyard were confirmed. Further observations with a Bravois bi-plate showed that for all points of the sun's limb between the equator, and about 15° to 20° from the north solar pole, there was no elliptical polarisation. Above this, the colours of the two plates could be clearly distinguished.—The method of Neumann and the problem of Dirichlet.—On the class of primitive continuous finite groups of transformations of Lie, by M. Edmond Maillet.—On the logarithms of the algebraical numbers, by M. Carl Störmer.—On the angular points of solubility curves, by M. H. Le Chatelier.—On the electrical distribution in a Hertz resonator in activity, by M. Albert Turpain.—Permanent modifications in metallic wires and variation of their electrical resistance, by M. H. Chevallier.—On the kathode rays, by M. P. Villard. A study of the heating effect produced upon the kathode. The usual metal electrodes can be replaced by ordinary lamp filaments, the kathode in this case being rapidly raised to a white heat. The fall of potential necessary for the production of light by a filament in this way is much greater than when the carbon is heated by the ordinary Joule effect.—The campylograph, a curve-tracing machine, by M. Marc Dechevrens. A new method of producing Lissajous figures. Instead of being confined to compounding two rectangular motions only, the instrument can combine three simultaneous movements, two rectilinear and oscillatory, the third uniform and circular. Seventeen illustrations of the results obtainable accompany the paper.—Heat of solution of hydrogen peroxide. Thermal value of the hydroxyl group: influence of carbon and hydrogen, by M. de Forcrand.—On the direct production by the wet method of mercuric and mercurous iodides in the crystalline state, by M. F. Bodroux. Mercuric iodide can be crystallised in octahedra from boiling concentrated hydrochloric acid or from a solution of potassium iodide. A better method is to leave mercuric acetate in contact with methyl iodide. The substitution of mercurous nitrate for mercuric acetate yields large crystals of mercurous iodide.—On the impossibility of the primary formation of potassium chlorate obtained electrolytically, by M. André Brochet. The electrolysis was carried out in presence of large amounts of oxide of cobalt. Since hypochlorites are destroyed by this oxide, whilst chlorates are unaffected, only chlorate which has been formed by primary interaction of the ions will be found. Since no chlorate is produced under these conditions, it follows that in the electrolysis of alkaline chlorides, contrary to the hypotheses of Œttel, Haber and Grinberg, Forster, Torre and Müller, the formation of chlorate is never due to a primary action, but is always due to the intermediate formation of hypochlorites, even in a strongly alkaline medium.—On the decomposition of metallic chlorides, by M. Œchsner de Coninck.—Addition of hydrogen to acetylene in presence of reduced iron or cobalt, by MM. Paul Sabatier and J. B. Senderens. At 180° reduced iron causes the interaction of hydrogen and acetylene, ethane, ethylene, benzene and higher unsaturated hydrocarbons being produced. Cobalt under similar conditions gives a much larger yield of ethane compared with that previously noticed for nickel.—On a product of decomposition of a diiodhydrin of glycerol, by MM. E. Charon and C. Paix-Séailles. The substance formed by the elimination of hydriodic acid from the iodhydrin, $CH_2I.CHI.CH_2OH$, is β-iodopropionaldehyde, most probably the polymer $(CH_2I.CH_2.CHO)_3$.—Action of acetylene upon cuprous chloride dissolved in a solution of potassium chloride, by M. Chavastelon.—On acidimetry and alkalimetry in volumetric analysis, by M. A. Astruc.—Fixation of clay in suspension in water by porous bodies, by M. J. Thoulet. Analysis of marine deposits consisting largely of shells, showed great variations in the amount of clay present, and it appeared possible that this clay might have been abstracted from the water after the death of the animal by mechanical means. Experiments with powdered pumice stone and with wood charcoal confirmed this view.—Preliminary note on the decapod crustacea collected during the Belgian Antarctic expedition, by M. H. Coutière.—The embryos of mummy wheat and barley, by M. Edmond Gain. A microscopical examination showed that in spite of their external appearance of good preservation, the mummy cereals do not possess a cellular organisation compatible with germination.—The ratio of nitrogen to chlorides in the contents of the stomach during digestion, by MM. J. Winter and Falloise.

ST. LOUIS.

Academy of Science, May 23.—A paper by Dr. Adolf Alt, entitled "Original contributions concerning the glandular structures appertaining to the human eye and its appendages," was presented by title.—Dr. M. A. Goldstein read a paper on the physiology of voice production, in which he discussed three essential factors in the production of voice—the motor force, the organ of sound, and the resonators.—Prof. F. E. Nipher read a short communication on the zero photographic plate, to which reference was made at the meeting of May 7 (see pp. 62, 159). The zero plate is one upon which a photographic image has been made, but which will develop no image in a bath placed in light of given candle power, at a distance of one metre from the source. For example, if the developing bath is twenty centimetres from a sixteen candle lamp, a Cramer isochromatic plate, such as is called "instantaneous," held for ninety seconds at a distance of one metre from the lamp, will be a zero plate. With an opaque stencil over the plate when placed in a printing frame during the exposure, there will develop a positive of holes through the stencil, if the exposure is longer, and a negative if the exposure is shorter. If a fresh plate is exposed in our camera with full opening to a brilliantly lighted street scene for one minute, it will develop as a positive in that same bath. This time can be somewhat reduced, but the least time needed has not yet been determined. It is evident that part of this minute is used in producing a zero plate. It is furthermore clear that different parts of the plate will arrive at the zero condition at different times. The exposure may be arrested at a time when the strongly lighted white background of a sign-board will develop white as a positive, and when the black letters will also show white as a negative. It has been found that when a plate is uniformly exposed over its whole surface to the extent that nothing would have developed had it been covered by a stencil, this plate may then be placed in a camera and exposed in the ordinary way, and a perfect positive will develop in the bath to which it has been adapted. This preliminary spoiling of the plate for developing a negative is a very advantageous preparation for taking a positive. It shortens the time of exposure, and ensures that a positive shall be obtained over all parts of the plate. It is not yet known how short the camera exposure may be made, but the present indications are that they will be as short as those now made in the taking of negative pictures. It is currently believed by photographers that in a positive plate the object has "printed its picture" upon the plate. This appears to be a misconception of the process. It is true that in an exposure of long duration an image shows on the plate before it is placed in the bath. But this image is blackest where the light has acted most. It is a negative. This picture disappears in the developing bath when illuminated. The plate becomes perfectly clean. The positive picture then develops exactly as a negative would under ordinary conditions.—Mr. J. B. S. Norton presented some notes on the flora of the south-western United States

DIARY OF SOCIETIES.

THURSDAY, JUNE 21.

ROYAL SOCIETY, at 4.30.—On the Effects of Changes of Temperature on the Elasticities and Internal Viscosity of Metal Wires: Prof. A. Gray, F.R.S., V. J. Blyth, and J. S. Dunlop.—On the Connection between the Electrical Properties and the Chemical Composition of Different Kinds of Glass, Part II.: Prof. A. Gray, F.R.S., and Prof. J. J. Dobbie.—On the Change of Resistance in Iron produced by Magnetisation: Prof. A. Gray, F.R.S., and Prof. E. T. Jones.—Underground Temperature at Oxford in the Year 1899, as determined by Five Platinum Resistance Thermometers: Dr. A. A. Rambaut, F.R.S.—On the Kinetic Accumulation of Stress, illustrated by the Theory of Impulsive Torsion: Prof. K. Pearson, F.R.S.—Lines of Induction in a Magnetic Field: Prof. Hele-Shaw, F.R.S., and A. Hay.—On the Spectroscopic Examination of Colour produced by Simultaneous Contrast: G. J. Burch, F.R.S.—An Experimental Investigation into the Flow of Marble: Dr. F. D. Adams and Dr. J. T. Nicolson.—A Criticism of the Young-Helmholtz Theory of Colour Perception: Dr. F. W. Edridge-Green.—And other Papers.

LINNEAN SOCIETY, at 8.—On some Scandinavian Crustacea: Dr. A. G. Ohlin.—The Subterranean Amphipoda of the British Islands: Chas. Chilton.—On certain Glands of Australian Earthworms: Miss Sweet.—Notes on Najas: Dr. A. B. Rendle.

ZOOLOGICAL SOCIETY, at 4.30.—The Gigantic Sloths of Patagonia: Prof. E. Ray Lankester, F.R.S.

ANATOMICAL SOCIETY (Owens College, Manchester), at 10.30.—Lantern Demonstration on the Comparative Anatomy and Histology of the True Cæcal Apex—the Appendix Vermiformis: Dr. R. J. Berry.—Lantern Demonstration of some Surface Markings of the Calvaria, and their Significance: Prof. Dixon.—Lantern Demonstration of Microphotographs of the Maturation Stages in the Ovum of Echinus: Dr. T. H. Bryce.—Some Points in the Anatomy of the Digestive System: Prof. Birmingham.—(*a*) Two Cases of Absent Vermiform Appendix; (*b*) A Specimen showing Direct Continuity between the Long External Lateral Ligament of the Knee-joint and the Peroneus Longus Muscle; (*c*) A Supernumerary Bone in the Carpus connected with the Trapezium: Prof. Fawcett.—A Note on the Genital Apparatus of the Jerboa: Dr. Armour.

CHEMICAL SOCIETY, at 8.—Ballot for the Election of Fellows.—Notes on the Chemistry of Chlorophyll: Dr. L. Marchlewski and C. A. Schunck.—Researches on Morphine, I.: Dr. S. B. Schryver and F. H. Lees.—A New Series of Pentamethylene Derivatives, I.: Prof. W. H. Perkin, jun., F.R.S., Dr. J. F. Thorpe, and C. W. Walker.—Experiments on the Synthesis of Camphoric Acid. III. The Action of Sodium and Methyl Iodide on Ethyl-dimethyl-butanetricarboxylate: Prof. W. H. Perkin, jun., F.R.S., and Dr. J. F. Thorpe.—On the Oxime of Mesoxamide and some Allied Compounds: Miss M. A. Whiteley.—The Oxyphenoxy- and Phenyleneoxy-acetic Acids: W. Carter and Dr. W. T. Lawrence.—(1) The Condensation of Ethyl α-Bromo-isobutyrate with Ethyl Malonates and Ethyl Cyanacetates: α-Methyl-α′-isobutylglutaric Acid; (2) Methylisoamylsuccinic Acid, II.: Dr. W. T. Lawrence.

FRIDAY, JUNE 22.

PHYSICAL SOCIETY, at 5.—Notes on Gas Thermometry: Dr. P. Chappuis.—A Comparison of Impure Platinum Thermometers: H. M. Tory.—On the Law of Cailletet and Mathias and the Critical Density: Prof. J. Young, F.R.S.

ANATOMICAL SOCIETY (Owens College, Manchester), at 10.30.—Note on the Configuration of the Heart in a Man and some other Mammalian Groups: Dr. C. J. Patten.—On the Arrangement of the Pelvic Fasciæ and their Relationship to the Levator Ani: Dr. Peter Thompson.—(*a*) A Preliminary Note on the Development of the Sternum; (*b*) Specimens of Diaphragmatic Hernia and of a Left Inferior Vena Cava: Prof. Paterson.—Preparations and Lantern Slides illustrating: (*a*) The Anatomy of the Subclavian and Axillary Arteries; (*b*) The Position and Relations of the Eustachian Tubes: (*c*) Stereoscopic Views of Anatomical Preparations: Dr. Arthur Robinson.—A Series of Microscopical Preparations illustrating the Development of the Posterior End of the Aorta: Prof. Young and Dr. Arthur Robinson.—Demonstration of a Series of Preparations of the Posterior End of the Adult Aorta: Prof. Young.

MONDAY, JUNE 25.

ROYAL GEOGRAPHICAL SOCIETY, at 8.30.—Results of the Sir George Newnes Antarctic Expedition: C. E. Borchgrevink.

TUESDAY, JUNE 26.

ROYAL PHOTOGRAPHIC SOCIETY, at 8.—The Selection of Lenses with regard to Photographic Perspective: J. H. Agar Baugh.—How to ascertain the Conjugates of a Lens without Calculation: Rev. F. C. Lambert.

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